AMENDMENTS

In the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Original) A method for preventing formation of photoresist scum, comprising the steps of:

providing a substrate on which a dielectric layer is formed;

forming a non-nitrogen anti-reflective layer on the dielectric layer; and

forming a photoresist pattern layer on the non-nitrogen anti-reflective layer, wherein during the formation of the photoresist pattern layer, the non-nitrogen anti-reflective layer does not react with the photoresist pattern layer, thus not forming photoresist scum.

2. (Original) The method as claimed in claim 1, further comprising forming an etching stop layer containing no nitrogen between the substrate and the dielectric layer.

3. (Original) The method as claimed in claim 1, wherein the non-nitrogen anti-reflective layer is a silicon-rich oxide layer.

4. (Original) The method as claimed in claim 1, wherein the non-nitrogen anti-reflective layer is a hydrocarbon-containing silicon-rich oxide layer.

5. (currently amended) A method for preventing formation of photoresist scum, comprising the steps of:

providing a substrate on which a dielectric layer is formed;

forming a non-nitrogen anti-reflective layer on the dielectric layer;

forming a first photoresist pattern layer on the non-nitrogen anti-reflective layer, wherein during the formation of the first photoresist pattern layer, the non-nitrogen anti-reflective layer does not react with the first photoresist pattern layer, thus not forming photoresist scum;

etching the non-nitrogen anti-reflective layer and the dielectric layer using the first photoresist pattern layer as a mask to form a via hole;

removing the first photoresist pattern layer to expose the non-nitrogen anti-reflective layer surface; and

forming a second photoresist pattern layer on the non-nitrogen anti-reflective layer, wherein during the formation of the second photoresist pattern layer, the non-nitrogen anti-reflective layer does not react with the second photoresist pattern layer, thus not forming photoresist scum.

6. (Original) The method as claimed in claim 5, further comprising forming an etching stop layer between the substrate and the dielectric layer.

7. (Original) The method as claimed in claim 6, further comprising forming a barrier layer between the etching stop layer and the dielectric layer to block a dopant in the etching stop layer from diffusing into the dielectric layer.

8. (Original) The method as claimed in claim 7, wherein the barrier layer is a silicon-rich oxide layer.

9. (Original) The method as claimed in claim 7, wherein the barrier layer is a hydrocarbon-containing silicon-rich oxide layer.

10. (Original) The method as claimed in claim 7, wherein the barrier layer has a thickness of 50 to 1000 A.

11. (Original) The method as claimed in claim 7, wherein the dopant is nitrogen.

12. (Original) The method as claimed in claim 5, wherein the non-nitrogen anti-reflective layer is a silicon-rich oxide layer.

13. (Original) The method as claimed in claim 5, wherein the non-nitrogen anti-reflective layer is a hydrocarbon-containing silicon-rich oxide layer.

14. (currently amended) A method <u>of preventing formation photoresist scum for dual damascene process</u>, comprising the steps of:

providing a substrate on which an etching stop layer, a dielectric layer, a first barrier layer, and an anti-reflective layer are formed~~, wherein the first barrier layer blocks a first dopant in the anti-reflective layer from diffusing into the dielectric layer~~;

etching the anti-reflective layer, the first barrier layer, and the dielectric layer to form a via hole therein;

forming a protective plug in the via hole;

forming a photoresist pattern layer on the anti-reflective layer, wherein the first barrier layer blocks [[the]] a first dopant in the anti-reflective layer from diffusing into the dielectric layer in order to prevent forming photoresist scum in the via hole; and

etching the anti-reflective layer, the first barrier layer and the dielectric layer using the photoresist pattern layer and the protective plug as a mask to form a trench above the via hole, thus forming a dual damascene structure.

15. (Original) The method as claimed in claim 14, wherein the first barrier layer is a silicon-rich oxide layer.

16. (Original) The method as claimed in claim 14, wherein the first barrier layer is a hydrocarbon-containing silicon-rich oxide layer.

17. (Original) The method as claimed in claim 14, wherein the first barrier layer has a thickness of 50 to 1000 A.

18. (Original) The method as claimed in claim 14, wherein the first dopant is nitrogen.

19. (Original) The method as claimed in claim 14, further forming a second barrier layer between the etching stop layer and the dielectric layer, wherein the second barrier layer blocks a second dopant in the etching stop layer from diffusing into the dielectric layer.

20. (Original) The method as claimed in claim 19, wherein the second barrier layer is a silicon-rich oxide layer.

21. (Original) The method as claimed in claim 19, wherein the second barrier layer a hydrocarbon-containing silicon-rich oxide layer.

22. (Original) The method as claimed in claim 19, wherein the second barrier layer has a thickness of 50 to 1000 A.

23. (Original) The method as claimed in claim 19, wherein the second dopant is nitrogen.

24. (Original) The method as claimed in claim 14, wherein the stop layer is a silicon-rich oxide layer.

25. (Original) The method as claimed in claim 14, wherein the stop layer is a hydrocarbon-containing silicon-rich oxide layer.

26. (Original) The method as claimed in claim 14, wherein the protective plug is i-line photoresist.

27. (Original) The method as claimed in claim 14, further forming a third barrier layer on the anti-reflective layer.

28. (Original) The method as claimed in claim 27, wherein the third barrier layer is a silicon-rich oxide layer.

29. (Original) The method as claimed in claim 27, wherein the third barrier layer is a hydrocarbon-containing silicon-rich oxide layer.

30. (Original) The method as claimed in claim 27, wherein the third barrier layer has a thickness of 50 to 1000 A.

31. (Original) A method of preventing formation photoresist scum for dual damascene process, comprising the steps of:

providing a substrate on which an etching stop layer, a first barrier layer, a dielectric layer, a second barrier layer, an anti-reflective layer, and a third barrier layer are formed;

etching the third barrier layer, the anti-reflective layer, the second barrier layer, the dielectric layer, and the first barrier layer to form a via hole;

forming a protective plug in the via hole;

forming a photoresist pattern layer over the anti-reflective layer, wherein the second barrier layer and the third barrier layers block a first dopant in the anti-reflective layer from diffusing into the dielectric layer and the first barrier layer blocks a second dopant in the etching stop layer from diffusing into the same, in order to prevent forming photoresist scum in the via hole; and

etching the third barrier layer, the anti-reflective layer, the second barrier layer and the dielectric layer using the photoresist pattern layer and the protective plug as a mask to form a trench above the via hole, thus forming a dual damascene structure.

32. (Original) The method as claimed in claim 31, wherein the first barrier layer is a silicon-rich oxide layer.

33. (Original) The method as claimed in claim 31, wherein the first barrier layer is a hydrocarbon-containing silicon-rich oxide layer.

34. (Original) The method as claimed in claim 31, wherein the first barrier layer has a thickness of 50 to 1000 A.

35. (Original) The method as claimed in claim 31, wherein the second barrier layer is a silicon-rich oxide layer.

36. (Original) The method as claimed in claim 31, wherein the second barrier layer is a hydrocarbon-containing silicon-rich oxide layer.

37. (Original) The method as claimed in claim 31, wherein the second barrier layer has a thickness of 50 to 1000 A.

38. (Original) The method as claimed in claim 31, wherein the third barrier layer is a silicon-rich oxide layer.

39. (Original) The method as claimed in claim 31, wherein the third barrier layer is a hydrocarbon-containing silicon-rich oxide layer.

40. (Original) The method as claimed in claim 31, wherein the third barrier layer has a thickness of 50 to 1000 A.

41. (Original) The method as claimed in claim 31, wherein the first dopant is nitrogen.

42. (Original) The method as claimed in claim 31, wherein the second dopant is nitrogen.

43. (Original) The method as claimed in claim 31, wherein the protective plug is i-line photoresist.